Chapter Eight – Design Elements of Refined Concept Plan

8.0 INTRODUCTION

This chapter provides an overview of the design elements of the Refined Concept Plan, including roadway cross-sections, traffic signal phasing, turn pocket needs and traffic signal warrants for the proposed signalized intersections along the corridor.

Analyses of the Preferred Concept Plan and Refined Concept Plan show that traffic will be diverted from the corridor if the mixed flow capacity of University Avenue is reduced from four-lanes to two-lanes. In addition to the design elements of the Refined Concept Plan, this chapter also identifies potential traffic calming measures that should be considered for the surrounding community to help manage traffic along the alternate routes.

8.1 DESIGN ELEMENTS OF REFINED CONCEPT PLAN

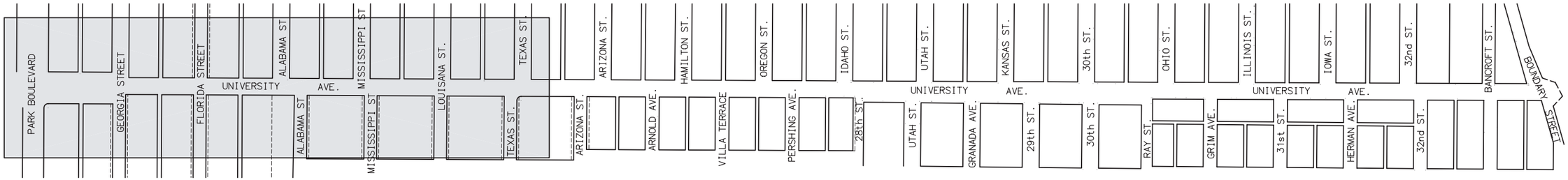
The Refined Concept Plan integrates many of the basic concepts of the Preferred Concept Plan. Exhibit 8-1 provides a plan view of the Refined Concept Plan. Each of the key elements of the Refined Concept Plan are described in detail below.

Roadway Improvements

Traffic Signals. Two new traffic signals are included in the Refined Concept Plan: University Avenue/Arnold Avenue and University Avenue/Oregon Street. Discussion of the traffic signal warrants conducted for these two intersections are provided in a later section of this chapter. One traffic signal will be removed at Ohio Street and replaced by an enhanced pedestrian crossing.

Traffic Signal Modifications. Signal modifications that involve adding a protected left turn phase are planned at several signalized intersections. Although left turn phases often lead to longer cycle lengths and delays to vehicles and pedestrians, the reduction in left turn access along the corridor would result in an increase in left turn traffic at the signalized intersections. To meet this increase in demand, new left turn phases will be necessary.

Raised Median. A raised median extends from Boundary Street to Park Boulevard. To allow the median to be planted, the minimum width of the raised median is 10 feet. This allows for 2 feet of paved surface area on each side of a six-foot plantable area. A sewer line runs down the centerline of University Avenue. Manhole access to the sewer line would need to be modified with the construction of the raised median to ensure that proper access is maintained.



KEY MAP
SCALE: 1"=500'

LEGEND

PEDESTRIAN IMPROVEMENTS

SYMBOL	DESCRIPTION
	RESTRIPE EXISTING CROSSWALK OR NEW CROSSWALK MODIFIED EXISTING CROSSWALK
	NEW ENHANCED SIDE STREET CROSSING
	NEW ENHANCED UNSIGNALIZED CROSSWALK
	REMOVE CROSSWALK

TRANSIT IMPROVEMENTS

SYMBOL	DESCRIPTION
	TRANSIT STOP
	TRANSIT ONLY LANE
	POTENTIAL TRANSIT ONLY LANE (ALT. 3)

STREET IMPROVEMENTS

SYMBOL	DESCRIPTION
	PROPOSED CURB EXISTING CURB
	NEW "STOP" SIGN
	NEW "TRANSIT ONLY LANE AHEAD MERGE LEFT" SIGN
	NEW "RIGHT TURN ONLY LANE BUSES EXEMPT" SIGN
	RAISED MEDIAN WITH LANDSCAPE
	REPAINT EXISTING STOP BAR & SYMBOL
	STRIPE RIGHT TURN ARROW

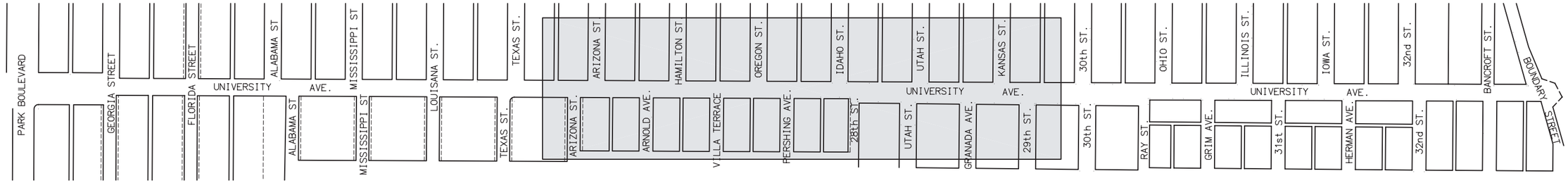
SIGNAL IMPROVEMENTS

SYMBOL	DESCRIPTION
	STRIPE LEFT TURN ARROW & INSTALL NEW PROTECTED LEFT TURN ARROW
	NEW TRAFFIC SIGNAL
	REMOVE EXISTING TRAFFIC SIGNAL

8-2

Not to Scale

REFINED CONCEPT PLAN



KEY MAP
SCALE: 1"=500'

LEGEND

PEDESTRIAN IMPROVEMENTS

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8-3

TRANSIT IMPROVEMENTS

SYMBOL	DESCRIPTION
	TRANSIT STOP
	TRANSIT ONLY LANE
	POTENTIAL TRANSIT ONLY LANE (ALT. 3)

STREET IMPROVEMENTS

SYMBOL	DESCRIPTION
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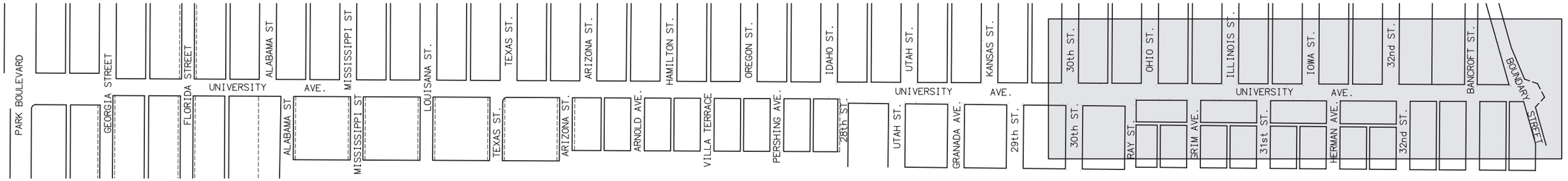
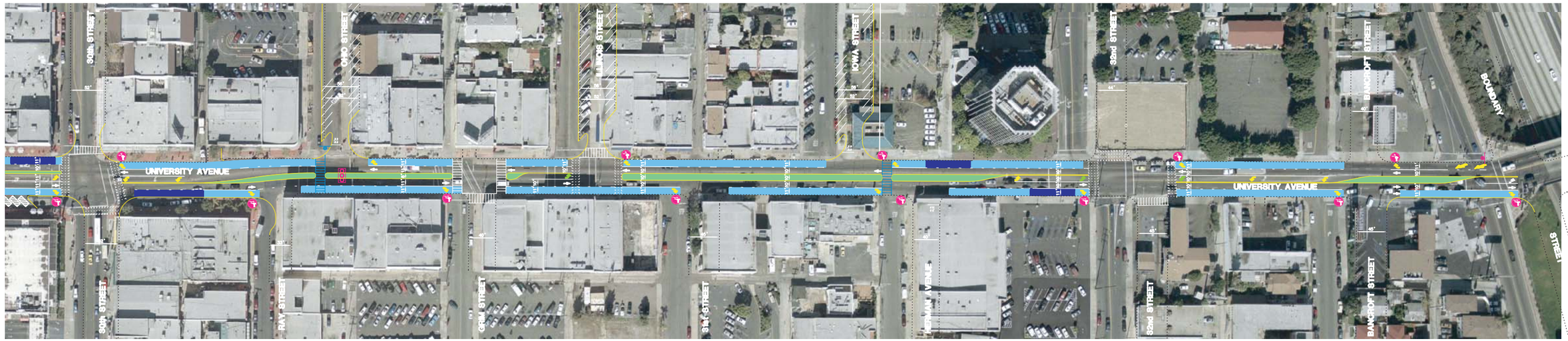
REFINED CONCEPT PLAN



KEY MAP
SCALE: 1"=500'



LEGEND

PEDESTRIAN IMPROVEMENTS

SYMBOL	DESCRIPTION
	RESTRIPE EXISTING CROSSWALK OR NEW CROSSWALK MODIFIED EXISTING CROSSWALK
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TRANSIT IMPROVEMENTS

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8-4

Not to Scale

REFINED CONCEPT PLAN

City regulations strictly prohibit planting large trees over an existing utility line for several reasons. First, access to the utility is impaired when trees are planted on top of a utility line. Often, the tree must be removed if the utility line needs to be repaired. Second, roots of trees often grow around or through wet utilities, resulting in damage and failure of such facilities.

To repair the utility lines due to roots or other elements, the trees and other landscaping would need to be removed. Shallow rooted trees or trees in planters are allowed and should be considered in place of planted trees. A detailed assessment of the planting materials should be evaluated in the design phase of the project.

Left Turn Pockets. The construction of the raised median will provide for left turn pockets at the signalized intersections. The raised median will end prior to the transition into the left turn pocket. Each signalized intersection will be designed with eastbound and westbound left turn pockets. Turn pocket length calculations were conducted for each signalized intersection based on forecast 2030 traffic volumes. The methodology and recommended turn pocket lengths are discussed later in this chapter.

Road Repaving and Striping. With the construction of the raised median and proposed striping modifications, University Avenue will be resurfaced and restriped. Observations along the corridor show that the typical crossfall (difference between centerline and edge of pavement) is between 4 and 6 percent for much of University Avenue. Standard crossfall is approximately 2 percent on a typical street. It is likely that the centerline of the roadway is much higher than the edge of pavement due to the buried railroad tracks and years of overlay. Research by North Park Main Street indicates that the existing tracks are located approximately 10 inches below the surface of the road. To verify this assumption, it is recommended that borings be collected in the design phase of this project to evaluate the pavement cross-sections at various points along the corridor. If the findings of the pavement study show that University Avenue should be reconstructed, it is recommended that centerline of the roadway be brought down to a more standard crossfall. This would require the removal of the existing tracks and potentially abandoned utility lines in the roadway.

SANDAG/MTS has requested that all transit stop platforms be raised to street level to allow for level boardings. With the existing crossfall of the roadway, this may require the platform be raised by several inches. In turn, this will impact drainage along the sidewalk and along the curb and gutter at all proposed transit stops. Lowering University Avenue and reconstructing the sidewalks in the vicinity of the transit stops may eliminate potential drainage issues. However, a detailed drainage study will need to be conducted to evaluate the impacts associated with raising these platforms.

Pedestrian Improvements

Enhanced Pedestrian Crossings. A total of five unsignalized enhanced pedestrian crossings on University Avenue and four enhanced side street crossings are included in the Refined Concept Plan:

Crossing University Avenue:

- Alabama Street
- Idaho Street/28th Street
- Kansas Street
- Ohio Street
- Herman Avenue / Iowa Street

Side Street Crossings:

- Alabama Street (north leg)
- Alabama Street (south leg)
- Idaho Street
- 28th Street

Enhanced pedestrian crossings on University Avenue would include flashing in pavement devices and highly reflective pavement markings warning drivers of the presence of a pedestrian in the crosswalk. The technology available at the time this report was prepared would require that the pedestrian press a button to activate the crossing. The in- pavement devices would continue to flash for a pre-determined time.

Exhibit 8-2 illustrates a typical enhanced pedestrian crossing system. As shown, the system would require a power source, activation technology (either push button or automatic sensor), control unit and in-pavement flashers.

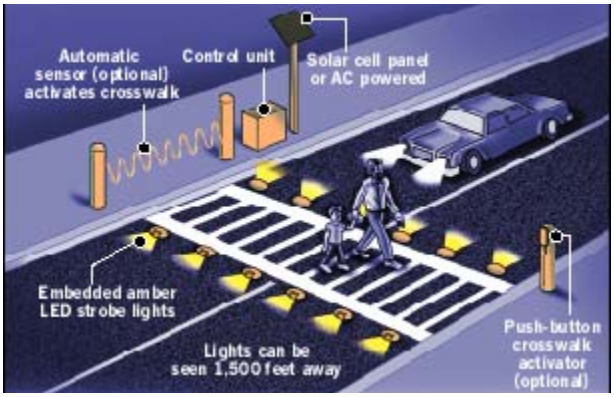


Exhibit 8-2 Enhanced Pedestrian Crossing Technology
Source: Lightguard Systems Inc.

Exhibit 8-3 illustrates some of the physical elements of the Enhanced Pedestrian Crossing System. At the time this report was prepared, the cost to construct a typical Enhanced Pedestrian Crossing was estimated to be $20,000 for a crossing across University Avenue. This includes installation of pedestrian push button, wiring of push button to control box, acquisition and installation of the control unit, connection to a power source, in pavement flashers and highly reflective pavement markings.

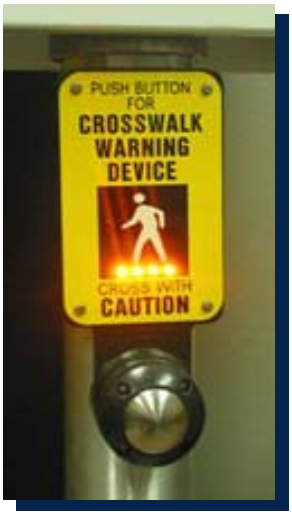


Exhibit 8-3 Enhanced Pedestrian Crossing Elements:
a) Pedestrian Push Button
b) Automated Sensor
c) In Pavement Flasher
Source: Lightguard Systems, Inc.

Curb Extensions (Bulb-outs or Pop-outs). Curb extensions, also called pop-outs or bulb-outs, will be provided at several intersections. Curb extensions reduce the exposure time for pedestrians as they cross the mixed flow lanes by reducing the distance from curb to curb. Curb extensions should only be provided on blocks where on-street parking is provided. As the Refined Concept Plan recommends that parking along University Avenue be removed or restricted, no curb extensions would be provided on University Avenue. Curb extensions are proposed on the side streets only.

Exhibit 8-4 illustrates the minimum design requirements for a curb extension according to the City of San Diego Street Design Manual. As shown, the minimum curb radius is 30 feet, which is consistent with the minimum turning radius for large (WB-50) trucks. Currently, the curb radius along University Avenue is between 15 and 25 feet. Therefore, the curb extensions will result in longer sweeping curbs.

The design manual recommends that the crosswalks be located at the narrowest point between the two curb extensions. Because the existing development is within 15 feet or less of the existing curb along University Avenue, existing buildings may block the view of a pedestrian in a crosswalk. Final design should evaluate the appropriate location of the crosswalk to meet minimum sight distance requirements.

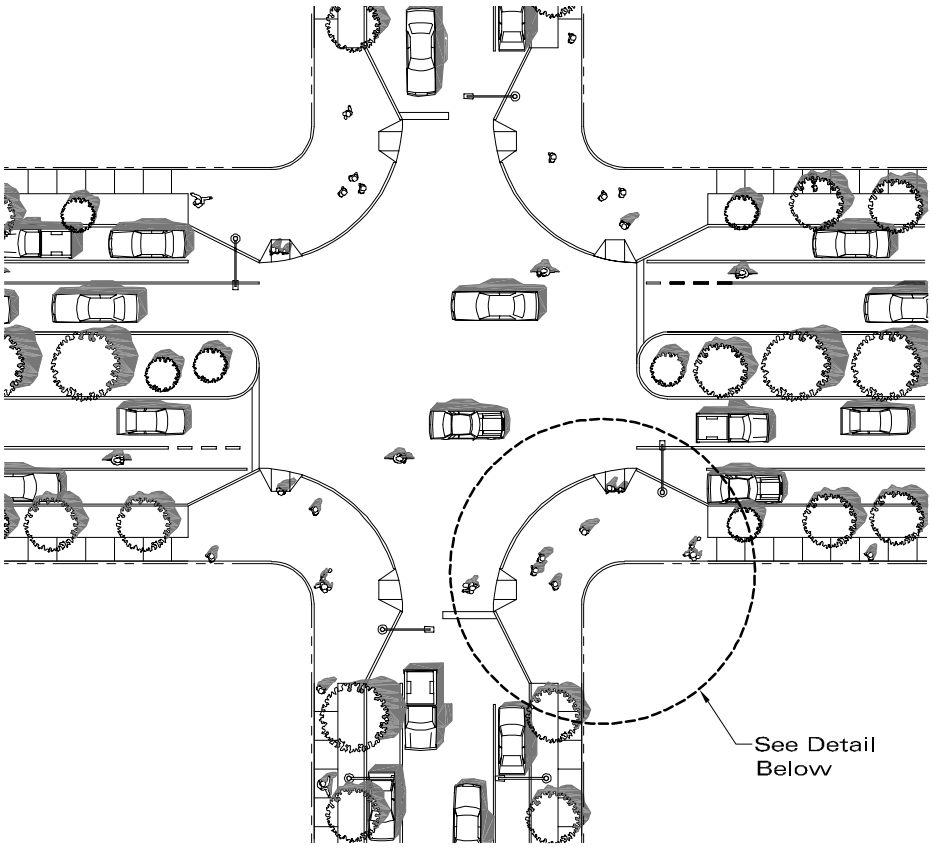
Transit Improvements

Consolidation of Transit Stops. A total of 20 transit stops are currently provided along University Avenue, serving Routes 7 and 908. The Refined Concept Plan will consolidate those transit stops to 10, providing 5 eastbound and 5 westbound, shown in Exhibit 8-5. The stops will be located at:

- Iowa Street/32nd Street
- 30th Street
- Pershing Street/Idaho Street
- Texas Street
- Alabama Street

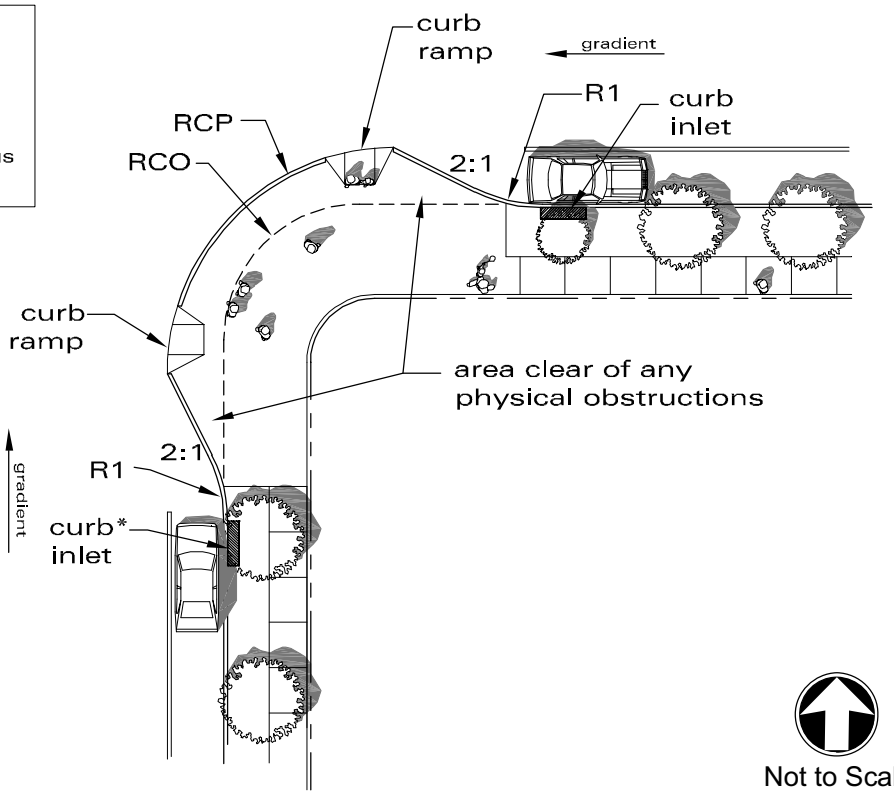
Each transit stop would be equipped with a minimum of seating, signage, concrete bus pad, raised sidewalk for at-grade boarding and trash receptacle. Of the 10 stops, 4 would also be equipped with a new Type 1 transit shelter: Texas Street (eastbound and westbound), Herman Street (eastbound) and Iowa Street (westbound). Type 1 transit shelters look like the historic streetcar and are intended to set the tone for streetscape along University Avenue. All other stops will be provided Type 2 transit shelters that are similar in design to those near 30th Street, with umbrella type canopies and tile covered square boxes for seating.

The current design of the transit shelters, as illustrated in the Concept Plan, should fit within the existing right-of-way. However it should be noted that no detailed plans for either of the shelters were provided to the consultant to determine if the shelters would fit into the intended station location. The Concept Plan notes that the "Type 2" shelter is to be located where sidewalk width is constrained. However, this will depend on the final opinion on whether the shelter designs were appropriate. As final designs for the shelters are created the locations and right-of-way width should be taken into consideration. This will ensure that there will be sufficient room for the transit shelter furniture, and for smooth pedestrian movement in the station area.



NOTE:
* Drainage requirements must be evaluated and addressed.

Legend
RCP - 30' (9.2 m) minimum
RCO - Retrofit installations- original curb radius
R1 - Curb radius 20' (6 m)



Source: City of San Diego
Street Design Manual, Nov. 2002,
Page 90.

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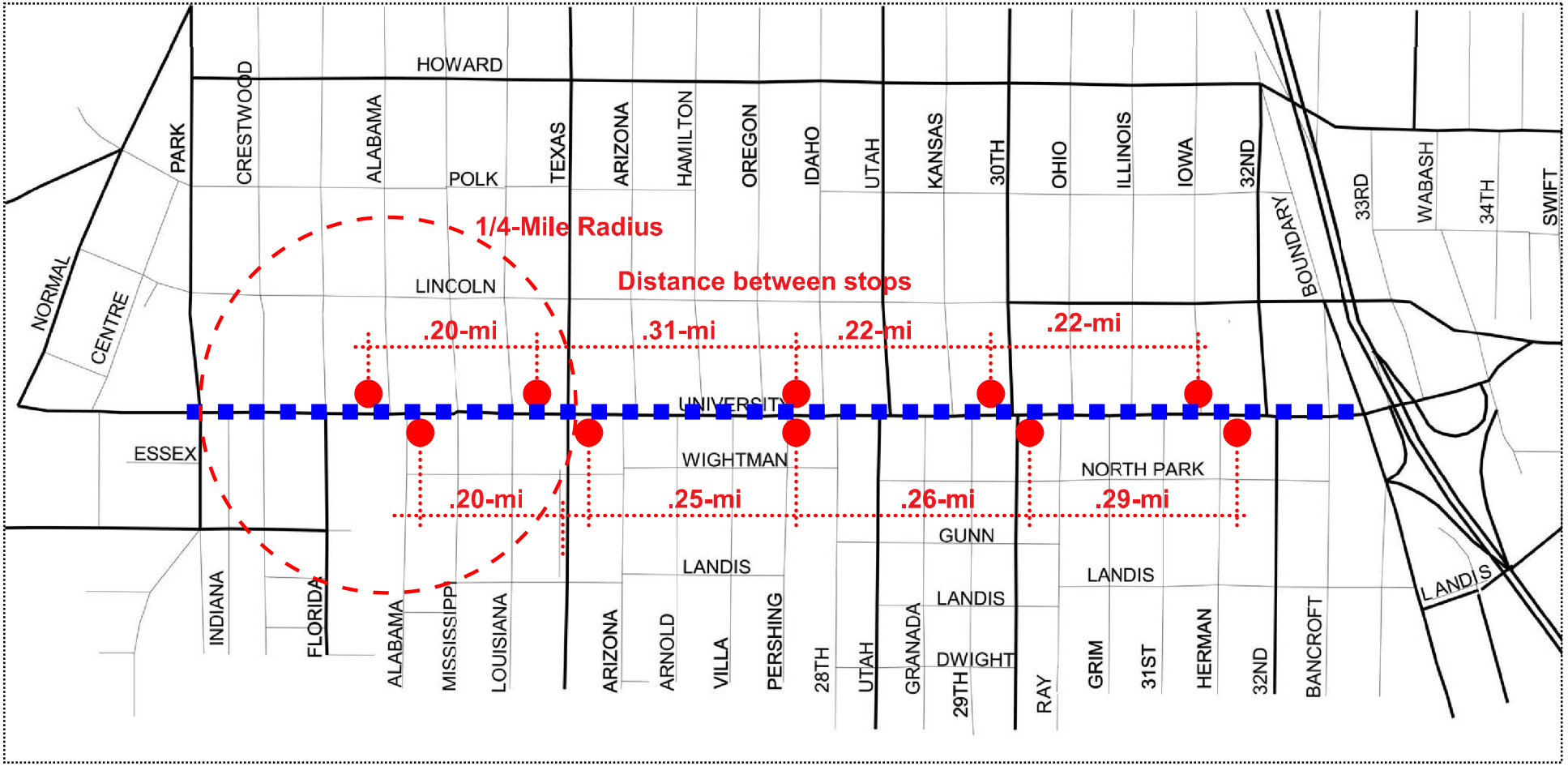
CURB-EXTENSION DESIGN STANDARDS



● Route 7 and 908 Proposed Transit Stops

.20-mi Distance Between Stops

Not to Scale

LOCATION OF PROPOSED TRANSIT STOPS WITHIN STUDY AREA

55-100148.001 - June 2004

EXHIBIT 8-5

Consistent with the Preferred Concept Plan, all of the transit stops proposed in the Refined Concept Plan are located on the farside of the intersection. Farside transit stops are a preferred location by most transit agencies including SANDAG/MTS. Farside stops have the added benefit of:

- Minimizing conflicts with right turning vehicles.
- Minimizing sight distance safety conflicts for both pedestrians and motorist.
- Encouraging pedestrians to cross behind the bus rather that in front of it.
- Better facilitating bus reentry into mixed-flow traffic.
- Allowing the transit vehicle to go through the intersection, thus eliminating the need to wait through another signal cycle.

Transit Only Lanes. The Refined Concept Plan includes transit only lanes in both the eastbound and westbound directions, as shown in blue in Exhibit 8-1. The eastbound transit only lane would extend from Utah Street to Boundary Street. Westbound, the transit only lane would extend from Boundary Street to Florida Street. At all intersections, a minimum 75' right turn pocket should be provided for mixed flow traffic. This is the only location where passenger vehicles should be allowed to enter the transit only lane (for right turns only).

Transit only lanes should be 11 feet wide throughout the corridor. The pavement should be color treated to clearly identify a difference in travel way. "Transit Only Lane" signs should be placed at 100-foot intervals along the corridor.

The Steering Committee and SANDAG prefer that the eastbound transit only lane extend from Park Boulevard to Boundary Street, as shown in orange in Exhibit 8-1. The Refined Concept Plan recommends the eastbound transit only lane from Utah Street to Boundary Street due to traffic operations along the corridor. The operational analysis of the corridor indicates that queues and delays would be significantly greater to passenger vehicles if the transit only lane begins at Park Boulevard, as there are no continuous alternative routes north and south of University Avenue. However, there are no physical differences in the roadway between the two alternatives. The only differences are the pavement markings and signage for the curbside lane. If future operations of the corridor show that traffic volumes along University Avenue are less than forecast and that University Avenue would operate acceptably with a single traffic lane, then the transit only lane could be extended to Park Boulevard.

In addition to the benefits of a transit only lane to transit vehicles, emergency vehicles may also benefit greatly from the proposed transit only lane design. Emergency service vehicles could either travel in the transit only lane or passenger vehicles would have the ability to move to the side of the road into the

transit only lane to allow emergency vehicles to pass. It should be noted that the City Fire-Rescue department has not had the opportunity to review the Refined Concept Plan.

Transit Signal Priority System. All queue jump technology recommended in the Preferred Concept Plan has been eliminated from the Refined Concept Plan. Instead, this study has included preliminary analysis of a Transit Signal Priority (TSP) system that would provide priority to transit vehicles, whether in a transit only lane or not. TSP provides preferential treatment for transit vehicles at traffic signals. This can be accomplished in several ways. The simplest passive-priority strategy is to set basic timings for intersection approaches to favor approaches used by transit vehicles. Other active-priority options are to provide green extensions and/or early green lights to transit vehicles running behind schedule at signalized intersections.

The latter TSP system involves the selection and implementation of on-vehicle technology, traffic signal controller modifications and central control technology. SANDAG/MTS and the City of San Diego are in the process of identifying an operating system through the Showcase project planned for El Cajon and Park Boulevards.

The VISSIM simulation model was used to estimate potential benefits of TSP along the University Avenue corridor. In the model, TSP was allowed at all signalized intersections, although it would not be necessary to implement TSP at all intersections. By assuming that TSP is installed at all signalized intersections, the determination could be made as to whether or not the TSP system: (1) improved transit operations at the individual intersections, and (2) impacted the side streets for those intersections.

In addition, the model assumed that all buses were eligible for, and received, TSP in the VISSIM simulation model. However not all buses would be granted TSP under actual operating conditions. In the VISSIM simulation model, buses were only granted a green extension when arriving at the end of the green phase. When granted, the green time was extended to allow the bus to pass through the intersection without stopping. In those instances when the green time could not be extended or the bus arrived during the red interval, the bus received an early green at the beginning of the next green phase.

Travel time values were obtained by running the VISSIM simulation model for each scenario 10 times and calculating the volume-weighted average travel times. The standard deviations of the average travel times in the runs for the refined concept plan with- and without-TSP scenarios were inconclusive due, in part, to the fact that all vehicles received priority. Transit vehicles ahead of schedule receiving priority contributed to the observed increases in standard deviation. The VISSIM simulation model runs indicated that some travel time reductions along the corridor associated with the implementation of TSP with the Refined Concept Plan, mainly during the evening peak period. Routes 7 and 908 experienced a range of average travel time changes from an increase in travel time of 16 seconds to a reduction in travel time of

57 seconds during the peak periods. Passenger vehicles on University Avenue also benefited from TSP due to reduced delay to through traffic when green time along the corridor is increased for transit vehicles.

The VISSIM simulation model run showed overall slightly reduced bus delay along the corridor, in particular:

	AM	PM
❖ Florida Street	1.2 seconds/ bus	4.3 seconds/bus
❖ Texas Street	4.3 seconds/bus	3.1 seconds/bus
❖ Arnold Avenue	0.5 seconds/bus	5.7 seconds/bus
❖ Oregon Street	0.4 seconds/bus	4.0 seconds/bus
❖ Utah Street	2.8 seconds/bus	4.6 seconds/bus
❖ 30th Street	0.9 seconds/bus	2.1 seconds/bus

These intersections demonstrated consistent delay benefits between time periods (a.m. and p.m.) and by direction (eastbound and westbound). The greatest benefit was achieved at Arnold Avenue in the p.m. peak hour when average bus delay through the intersection was reduced by more than 5.0 seconds. Similar results were achieved at Florida Street and Utah Street, each with forecast reduced bus delay time of more than 4.0 seconds in the p.m. peak hour.

When considering TSP, impacts to the side street should also be analyzed to determine if the priority timing significantly impacts side street operations and delay. The VISSIM model assumed in all cases that the extra green time allocated to the buses was taken from the side streets, although, it is possible to allow the green time to be taken from the left turn phases. In either case, as a result, queues may develop and operations may not recover until demand on the left turn or side street is reduced. Using the VISSIM simulation model, Texas Street was determined to be most significantly impacted on the side street by the implementation of TSP with nearly a 5 percent (21.4 seconds) increase in side street delay in the p.m. peak hour and an 8.5 percent (5.4 seconds) increase in side street delay in the p.m. peak hour.

Although the simulation model assumed that all intersections were equipped with TSP and all buses were provided TSP, actual operations in the field would be far more restrictive. For example, a bus traveling ahead of schedule does not need to be provided priority. If priority is provided to a bus traveling ahead of schedule, the bus will sit at the next stop until the schedule is once again achieved. A conditional priority system should be considered to allow TSP only when buses are running behind schedule.

The segment of University Avenue studied covers only a limited portion of the transit routes. The estimated potential benefits of TSP shown in this preliminary analysis were only incremental over those provided by the transit only lanes and the results are inconclusive due to the high standard deviation in the

travel time values between runs. A future study focused specifically on TSP operations should be conducted to evaluate the potential TSP benefits across the entire length of the transit corridor (Route 7 and Route 908). The focused study should integrate City of San Diego specific TSP operations, including conditional priority. TSP recommendations should be developed for the individual intersections along the entire length of the transit corridor. For more information on the TSP analysis conducted specifically for the University Avenue Mobility Plan, please see Appendix L.

Parking

Parking was one of the most controversial elements of the Refined Concept Plan. The Preferred Concept Plan recommended that on-street parking be maintained through the most congested segments of the University Avenue corridor. Analysis of the operations of the corridor shows that during the peak hours, this on-street parking would result in significant delays due to the merging maneuvers for both passenger vehicles (into right turn lanes) and transit vehicles (into and out of transit stops and right turn lanes). Travel time with the on-street parking was forecast to range from 15 to 21 minutes depending on the direction of travel in the peak hours. Current travel time along the corridor is approximately 7 to 8 minutes. Therefore, it is recommended that on-street parking be restricted, if not removed from University Avenue. By restricting the parking to off-peak hours or removing the on-street parking, a continuous transit only lane can be provided in each direction without the need for transit vehicles to merge into and share the mixed flow lanes resulting in optimal transit operations.

However, a few business owners on the north side of University Avenue expressed a concern that the removal of the on-street parking would pose loading problems for their businesses. Between Iowa Street and Idaho Street, buildings on the north side of University Avenue do not have rear access. Therefore all loading and unloading occur on University Avenue. To meet the needs of businesses on the north side of University Avenue, a short-term alternative was developed.

In the short-term, on-street parallel parking would be permitted in the off-peak period between Idaho Street and Iowa Street. Between the hours of 7:00 and 9:00 a.m. and between 4:00 and 6:00 p.m., on-street street parallel parking would be prohibited to allow for the continuous transit only lane along the corridor. Consideration was made to prohibit on-street parallel parking though the core but allow for commercial loading intermittently where rear access is not provided. This configuration may lead to increased merging by buses into and out of the mixed flow lane, and would be difficult to enforce.

The long-term parking goal would be to remove all on-street parallel parking along University Avenue. This would meet SANDAG's goal of improved transit service and the community goal of creating a transit oriented village. Surveys collected at the June 12th public workshop indicate that many

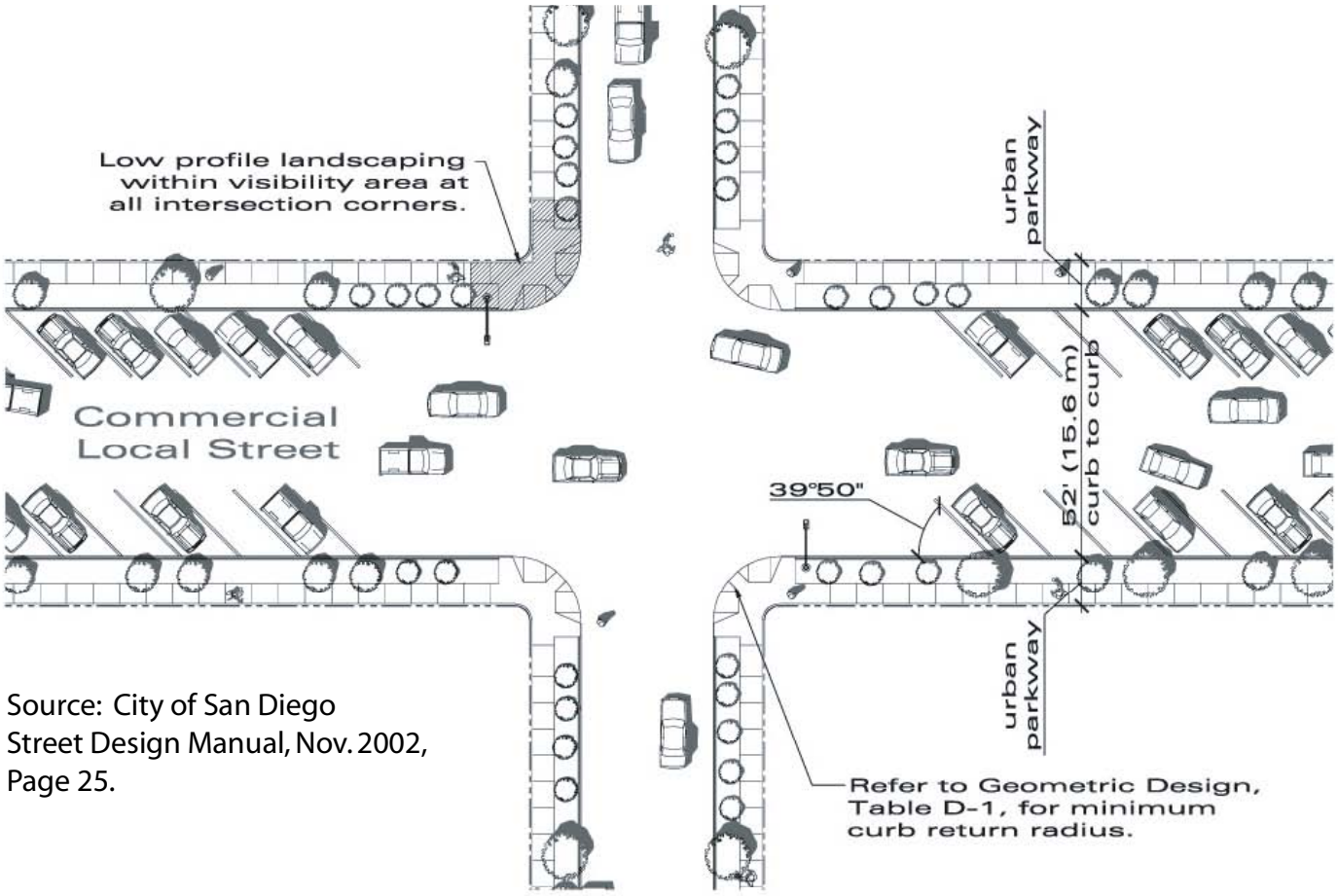
participants feel the restricted parking would be confusing and unnecessary. The Steering Committee and SANDAG support the proposal to remove parallel parking on University Avenue.

In addition to the parking modifications along University Avenue, side street improvements have been identified that convert parallel parking on side streets to diagonal parking. A total of seven streets on the north side of University Avenue were identified to have curb-to-curb widths of 52 feet or wider. Based on City standards for collector roadways, diagonal parking can be provided on both sides of the street within the 52 foot curb-to-curb width. The design of such roadways as provided in the November 2002 City of San Diego Street Design Manual is illustrated in Exhibit 8-6.

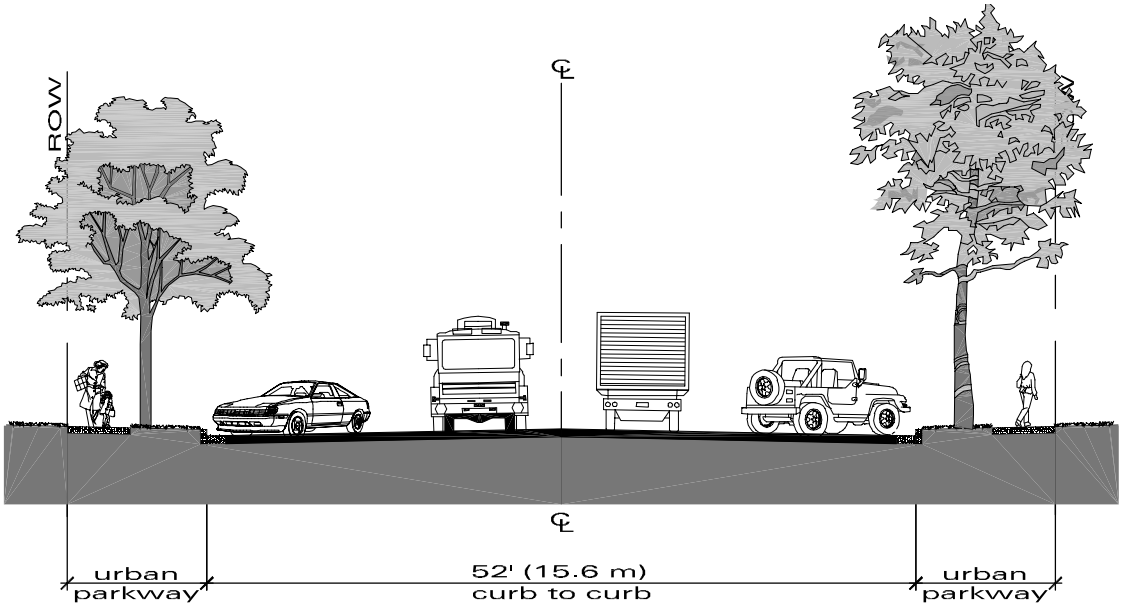
Allowing parking in the transit only lane will impact the ability for emergency vehicles to respond to incidents along the corridor. With the construction of the raised median, directional capacity for emergency vehicles will be constrained to a single 10 to 11 foot travel lane if on-street parallel parking is permitted along University Avenue. The minimum curb-to-curb width recommended by emergency services is approximately 22 feet to allow passenger vehicles to move to the side and for emergency vehicles to safely pass. If the minimum width is not provided, emergency vehicles will be required to wait through traffic to reach their destination. Due to the accelerated project schedule, the City Fire-Rescue department has not had the opportunity to review the Refined Concept Plan. This will need to take places as the project progresses. It is anticipated that emergency services will not support the proposed restricted parking alternative for University Avenue.

8.2 CROSS-SECTIONS

Cross-sections provide a street level view of the corridor that illustrate lane widths, lane utilization type and other key elements of the roadway that cannot be illustrated in a plan or overhead view. A total of four typical cross-sections illustrate the changes in design along University Avenue with the Refined Concept Plan. Exhibit 8-7 illustrates the locations of the cross-sections. Typical cross-sections are illustrated in Exhibits 8-8 through 8-11.



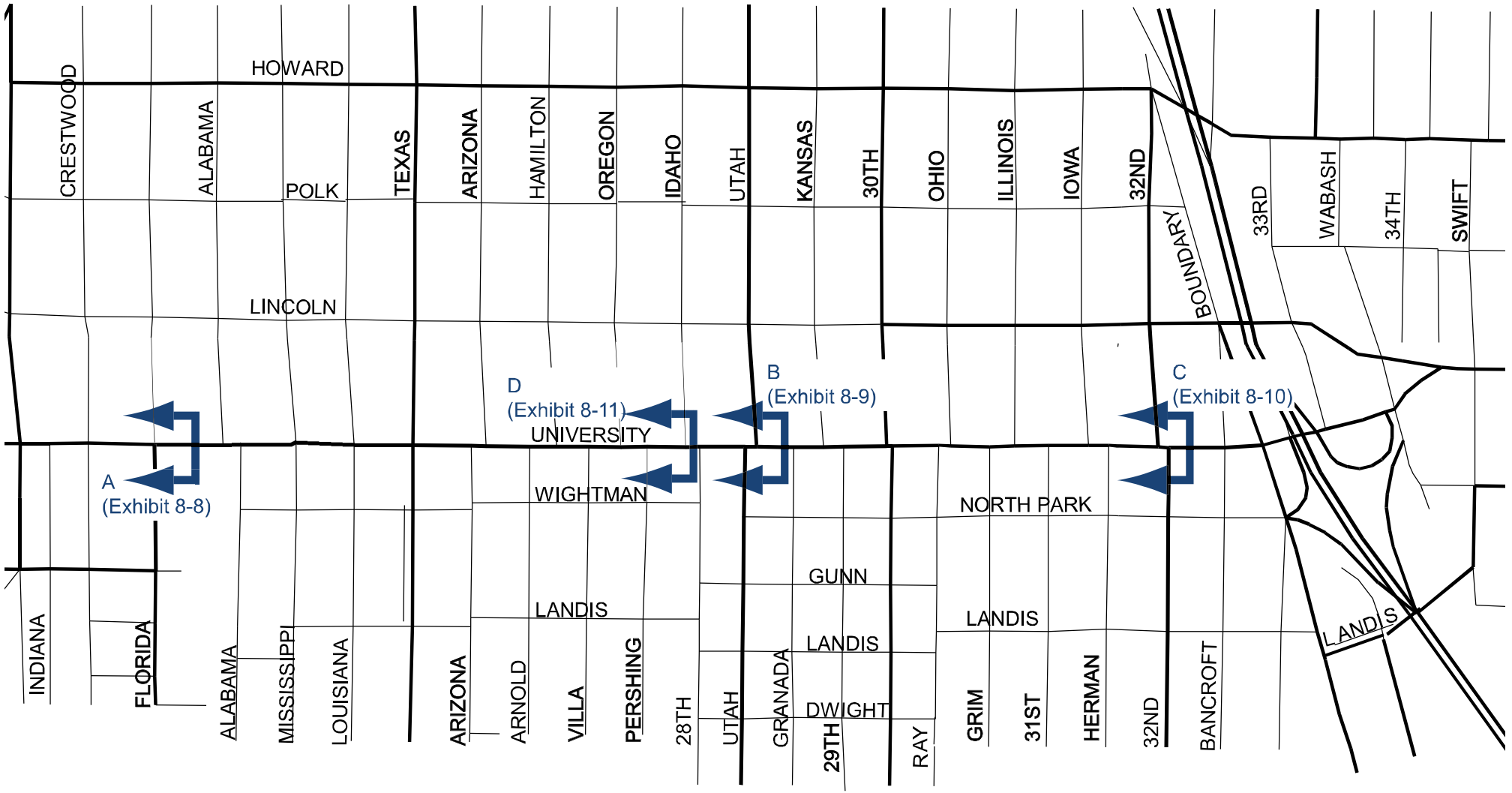
Source: City of San Diego
Street Design Manual, Nov. 2002,
Page 25.



with diagonal parking on both sides

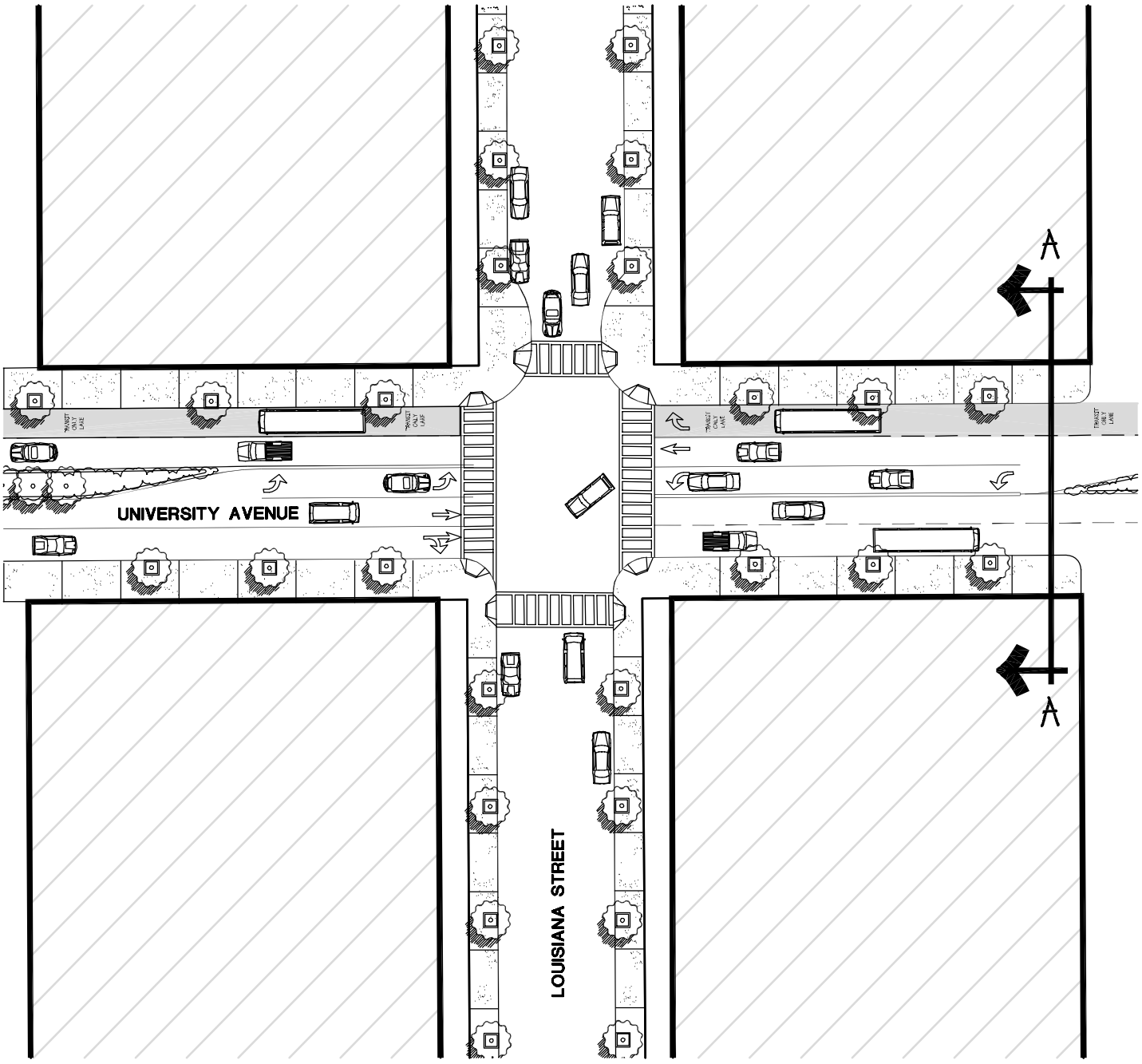
Not to Scale

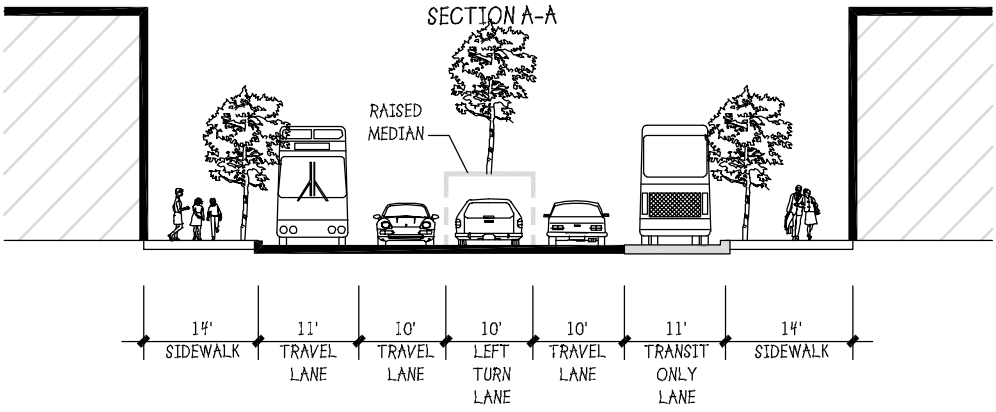
SIDE STREET DIAGONAL PARKING CROSS-SECTION



8-15

CROSS-SECTIONAL VIEWS





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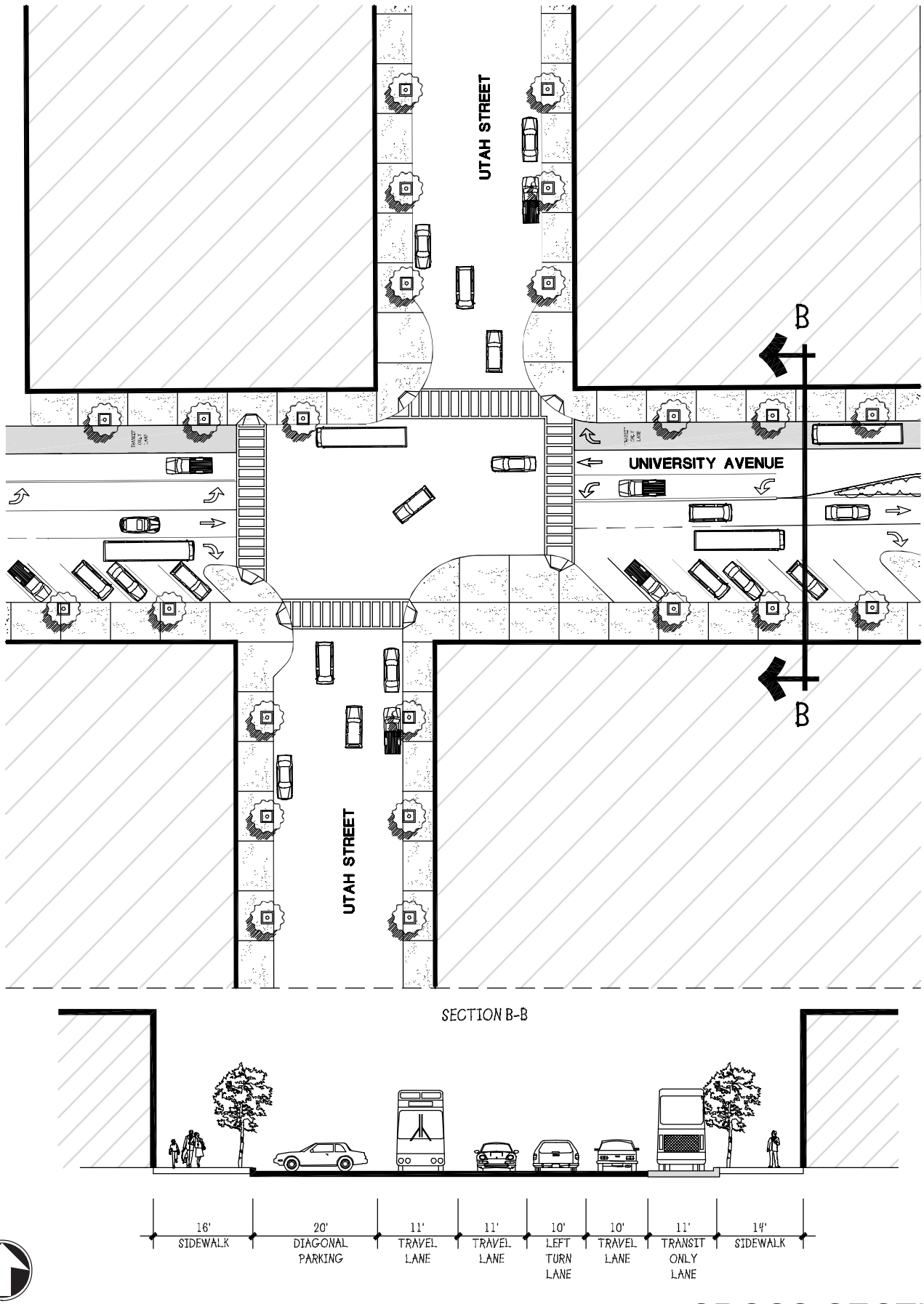
CROSS-SECTION A-A
Park Boulevard to Utah Street



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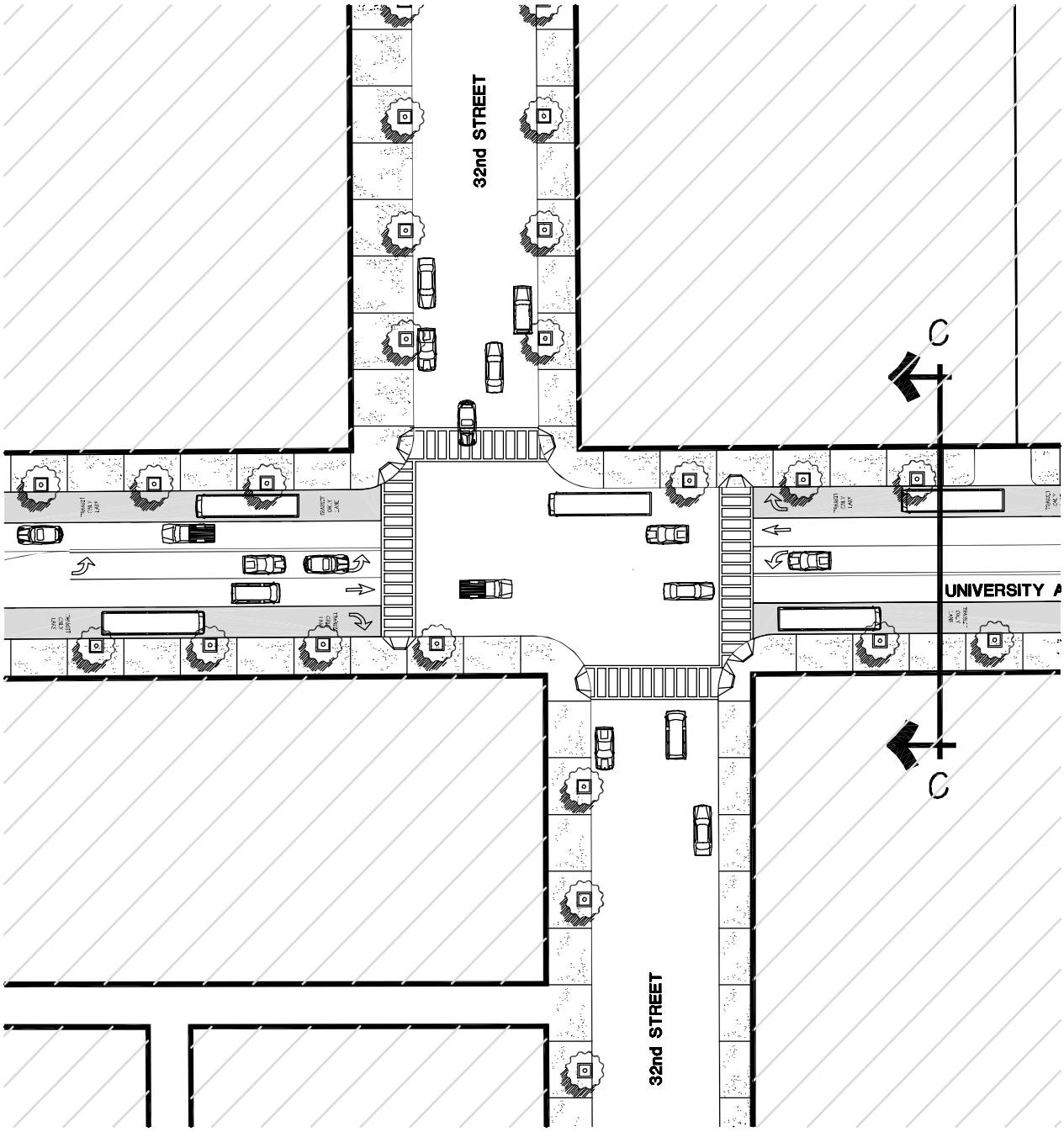
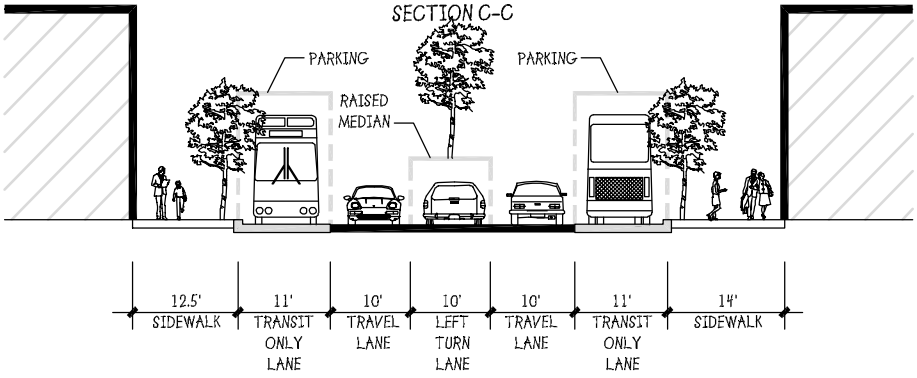
CROSS-SECTION B-B
28th Street to 30th Street





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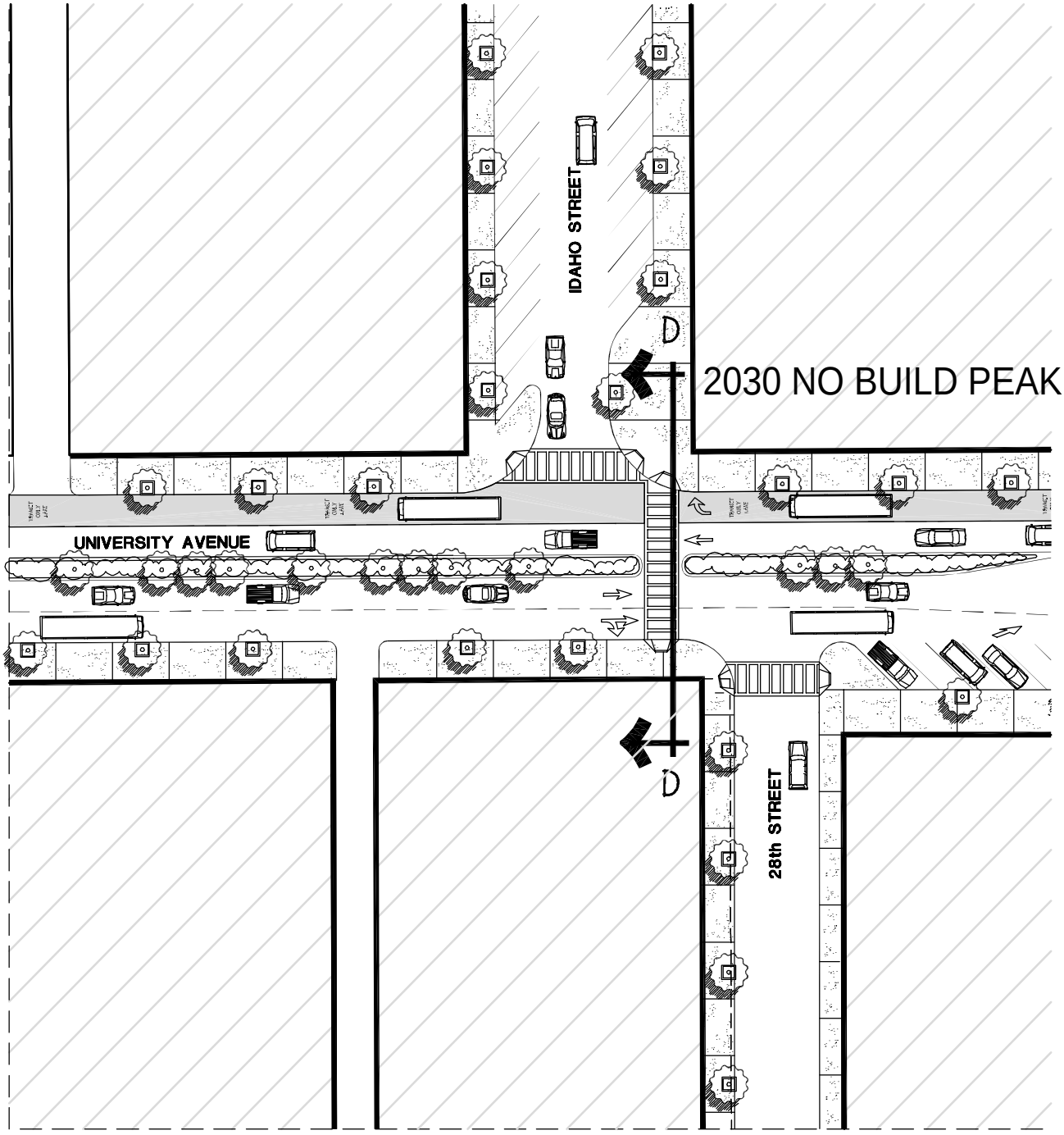
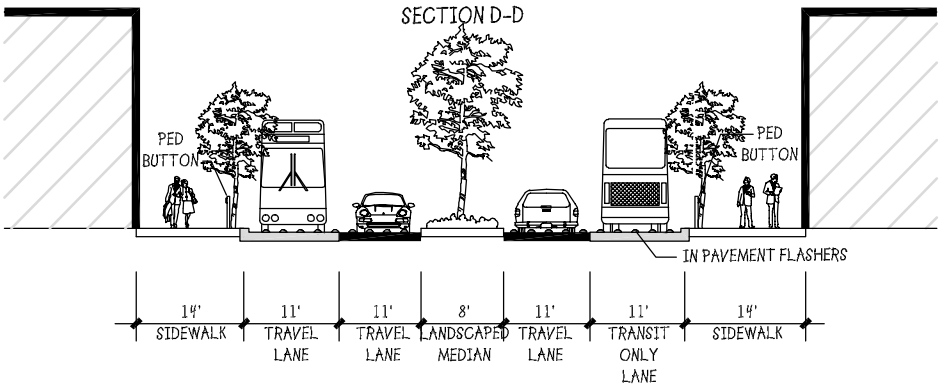
CROSS-SECTION C-C
28th Street to Boundary Street





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CROSS-SECTION D-D
Enhanced Pedestrian Crossing

Cross-section A, illustrated in Exhibit 8-8, provides an overview of the typical roadway segment from Park Boulevard to 28th Street. Through this section, two mixed flow travel lanes would be provided eastbound. Westbound, one mixed flow lane and one transit only lane would be provided. A ten-foot raised median would be provided which would become a ten-foot left turn lane at signalized intersections. On-street parking would be prohibited on both the north and south sides of the street through this section.

Cross-section B, illustrated in Exhibit 8-9, provides an overview of the typical roadway section from 28th Street to 30th Street, where on-street diagonal parking is provided on the south side of University Avenue. The existing on-street diagonal parking would be unaffected by the transit only lanes or the design of the Refined Concept Plan. West of Utah Street, two mixed flow lanes are provided. The outside or curb lane converts to a dedicated right turn lane at Utah Street, resulting in a single mixed flow through lane and a dedicated transit only lane east of Utah Street. Westbound, the transit only lane is provided from 28th Street to 30th Street. All on-street parallel parking along the north side of University Avenue, located within the transit only lane, would be prohibited during the peak hours only (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.). Off-peak on-street parallel parking would be permitted on the north side of University Avenue through this section.

Cross-section C, illustrated in Exhibit 8-10, provides an overview of the typical roadway section from 30th Street to Boundary Street. Through this section, transit only lanes would be provided both eastbound and westbound. In the short-term parking would be allowed during the off-peak periods in the transit only lane both eastbound and westbound. In the long-term, this parking would be removed.

Cross-section D, illustrated in Exhibit 8-11, provides an overview of the typical unsignalized enhanced pedestrian crossing along the corridor.

8.3 TURN POCKET LENGTH CALCULATIONS

Under existing conditions, left turning and through vehicles share a common lane along University Avenue at many intersections. At most intersections, this left turn movement is an unprotected movement, such that left turning vehicles must wait for gaps in traffic to make their turn. The following intersections currently have left turn pockets:

- Park Boulevard
- Florida Street
- Texas Street
- 30th Street
- 32nd Street

The Refined Concept Plan will maintain these left turn pockets and add eastbound and westbound left turn pockets at the following intersections:

- Mississippi Street
- Arnold Avenue (westbound)
- Oregon Street (eastbound)
- Utah Street
- Illinois Street
- Boundary Street

The length of the left turn pocket is critical. If left turn pockets are not long enough, queued left turn vehicles will spill over into the through lane, thereby blocking and reducing the capacity of the through lane. Therefore, left turn pocket calculations were conducted for each leg of each signalized intersection where a left turn pocket is proposed. Table 8-1 summarizes the recommended minimum left turn pocket storage lengths, based on Horizon Year 2030 with Preferred Concept Plan peak hour volumes.

Table 8-1
Recommended Left Turn Pocket Lengths

Intersection	Existing Pocket Length				Proposed Pocket Length			
	EB	WB	NB	SB	EB	WB	NB	SB
Park Boulevard	150	135	90	160	270	220	220	230
Florida Street	60	40	--	--	70	130	--	--
Mississippi Street	--	--	--	--	70	90	--	--
Texas Street	100	100	100	150	350	90	120	250
Arnold Avenue	N/A	--	--	N/A	N/A	80	--	N/A
Oregon Street	--	N/A	N/A	--	130	N/A	N/A	--
Utah Street	--	--	70	120	100	80	180	130
30th Street	60	75	60	50	140	230	140	70
Grim Avenue	N/A	N/A	--	N/A	N/A	N/A	--	N/A
Illinois Street	--	N/A	N/A	--	110	N/A	N/A	--
32nd Street	60	80	100	80	100	230	250	60
Boundary Street	60	--	--	--	100	--	--	--

These recommended left turn pocket lengths were drafted into the raised median designed on the Refined Concept Plan. Each location was reviewed to ensure that the length of the left turn pocket did not result in an unsafe condition at an upstream location. It was determined that at Texas Street, the eastbound left turn pocket should be shortened so as to not extend past the intersection of University Avenue/Louisiana Street. It is critical that the raised median extend through the unsignalized intersections to control left turn access. If the eastbound left turn lane were allowed to extend through Louisiana Street, the raised median would not be able to extend through the intersection. Therefore, it is recommended that the Texas Street eastbound left turn lane be shorter than the calculated length. Traffic signal timing at this intersection will be critical to prevent overflow left-turn queues from impacting the through lane.

8.4 PROTECTED LEFT TURN PHASING

A left turn phase is warranted, based on the Caltrans Traffic Manual and City of San Diego Guideline, if on or more of the following exist:

- Accidents – 5 or more left turn accidents occurred at that location involving left turning vehicles in a 12-month period.

- Delay – Left turn vehicles experience LOS E or worse delay (waiting through one or more cycles).

- Volumes – 50 or more left turning vehicles per hour and the product of the left turn volume and the sum of the conflicting right turn and through volume is greater than 100,000 in the peak hour (50,000 for a 2-lane road).

- Miscellaneous – Consideration of other factors such as curvature of the roadway, heavy bus or truck activity, etc. should be made when determining a need for a protected left turn phase. This includes analysis of sight distance requirements associated with both the horizontal and vertical curvature of the roadway. Minimum stopping sight distances are a key criteria in evaluating the need for a left turn phase.

Protected left turn phasing or protected/permissive left turn phasing along University Avenue is currently provided at:

- Park Boulevard
- Florida Street
- Texas Street
- 30th Street

- Boundary Street (Split Phase)
- Wabash Avenue (Split Phase)

The Refined Concept Plan recommends the implementation of protected or protected-permissive left turn phasing along University Avenue at the following intersections:

- Mississippi Street
- Arnold Avenue
- Utah Street
- 30th Street
- Illinois Street
- 32nd Street

A protected left turn phase warrant analysis based on traffic volumes was conducted for all the signalized intersections that currently do not have protected left turn phasing. The warrant analysis is based on the forecast 2030 with Preferred Concept Plan traffic volumes. Intersections where the product of the through volume and opposing left turn volume is greater than 50,000 (2-lane road) were determined to be warranted. Table 8-2 summarizes the results of this analysis.

Table 8-2
Protected Left Turn Warrant Analysis

Intersection	Peak Hour	Eastbound			Westbound			Warranted?
		Left Turn Volume	Conflicting (WB) Thru + Right	Total	Left Turn Volume	Conflicting (EB) Thru + Right	Total	
Mississippi Street	A.M.	12	833	9,996	39	413	16,107	Yes
	P.M.	55	546	30,030	75	823	**61,725**	
Arnold Avenue	A.M.	--	--	--	32	439	14,048	No
	P.M.	--	--	--	68	692	47,056	
Oregon Street	A.M.	44	699	30,756	--	--	--	Yes
	P.M.	110	675	**74,250**	--	--	--	
Utah Street	A.M.	33	539	17,787	59	431	25,429	No
	P.M.	84	469	39,396	55	577	31,735	
Illinois Street	A.M.	18	651	11,718	--	--	--	No
	P.M.	63	616	38,808	--	--	--	
32nd Street	A.M.	53	682	36,146	141	576	**81,216**	Yes
	P.M.	88	557	49,016	196	513	**100,548**	

Note: Bold indicates movements that meet or exceed the minimum threshold for left turn phase (100,000 for 4-lane intersections and 50,000 for 2-lane street.).

As shown in Table 8-2, left turn phasing is warranted based on traffic volumes at Mississippi Street, Oregon Street and 32nd Street based on traffic volumes alone. However, special consideration should be made at the other signalized intersections that would lead to the need for protected left turn phasing.

- Arnold Avenue is a T-intersection. The volumes at the intersection do not support a left turn phase. Other factors that may affect the need for protected left turn phasing include stop sight distance and consistency. Although not warranted, this may be the only intersection along the corridor without phasing. To provide a consistent application of left turn phasing along the corridor, it should be considered at this location. Arnold Street is also located at the bottom of a vertical curve. Stopping sight distance should be evaluated in determining the need for a protected left turn phase.

- Utah Street is an offset intersection. As proposed, the eastbound transit only lane will begin on the east side of Utah Street. Merging for the lane drop will occur west of Utah Street. Left turn phasing in conjunction with the left turn pocket is recommended at this location to help minimize any left turn queues that may spill over into the through lane. Spill over would further complicate the operations at the intersection where the mixed flow traffic merges into a single lane (west of Utah Street). The left turn phase could be set such that the left turn demands are met and spill over does not occur. Therefore, protected left turn phases are recommended at Utah Street.

- Illinois Street is a T-intersection. Although not warranted based on traffic volume alone, protected left turn phasing is recommended at Illinois Street. This intersection is located in the most dense and heavily traveled portions of the corridor. With the removal of the Ohio Street traffic signal, it is anticipated that left turning traffic at Illinois Street will increase. To meet the future demands, it is recommended that a protected left turn phase be installed at Illinois Street.

Implementation of a left turn phase will require modification to the traffic signal timing, installation or modifications to in-pavement loop detectors, modification or replacement of the signal mast arms and signal heads, and construction of the dedicated left turn pockets. The operations of the protected or protected-permissive phasing will be dependant upon further study at each intersection during the design phase.

Because of the increase in traffic volumes along University Avenue and the reduction in the number of left turn access points to and from University Avenue, left turn phasing will become a critical element of signal operations. As traffic volumes increase along the corridor, the need for left turn phases should be monitored and they should be installed as necessary to meet the increasing demands.

8.5 TRAFFIC SIGNAL WARRANT ANALYSIS

Two new traffic signals are recommended along University Avenue at Arnold Avenue and Oregon Street. A traffic signal warrant analysis, based on the Caltrans Traffic Manual, was conducted for each intersection to validate the recommendation for these new traffic signals. The following traffic signal warrants were prepared:

- Planning Warrant (Minimum Traffic and Interruption of Continuous Traffic)
- Peak Hour Volumes
- Four Hour Volumes

The traffic signal warrant worksheets are summarized in the Appendix at the conclusion of this report. Table 8-3 summarizes the results of the traffic signal warrant analysis. Planning Warrants are based on forecast ADT traffic volumes (Horizon Year 2030 with Preferred Concept Plan), and are typically recommended for new intersections or locations where actual traffic count data cannot be collected. Since the Preferred Concept Plan will alter the traffic patterns along the corridor, and data reflecting these conditions cannot feasibly be measured, it is appropriate to evaluate the intersections using this warrant. As shown, the Interruption of Continuous Traffic portion of the Planning Warrant is satisfied for both Arnold Avenue and Oregon Street. The Planning Warrant Interruption of Continuous Traffic indicates that the flow of traffic on University Avenue will be so heavy that the traffic on the side street suffers excessive delay or hazard in entering or crossing University Avenue.

The Peak Hour and Four Hour Volume warrants are based on four hours of traffic count data. For these warrants, the forecast Horizon Year 2030 with Preferred Concept Plan peak hour intersection volume was used. As shown in Table 8-3, neither of the two warrants is satisfied at either intersection.

Table 8-3
Traffic Signal Warrant Analysis

	Arnold Avenue	**Oregon Street**
Planning Warrant	Interruption of Continuous Traffic Warrant Met	Interruption of Continuous Traffic Warrant Met
Peak Hour volumes	Warrant Not Met	Warrant Not Met
Four Hour Volumes	Warrant Not Met	Warrant Not Met

Although the Peak Hour Volumes and Four Hour Volumes traffic signal warrants are not met at these locations, it should be noted that the intersections are forecast to operate at unacceptable service levels in the peak hours without traffic signals. The failing levels of service indicate that side street traffic trying to access University Avenue would experience significant delays if traffic signals are not installed. Installing traffic signals at these locations would also allow left turn access to and from University Avenue at consistent three to four block intervals along the entire corridor. It would also provide a controlled north-south pedestrian crossing. Currently, there are no traffic signals that allow protected left turns or signalized pedestrian crossings between Texas Street and Utah Street.

8.6 RECOMMENDED TRANSIT & PEDESTRIAN LINKAGE IMPROVEMENTS

This section discusses how selected streets can provide logical pedestrian access to the proposed transit stops, based on the pedestrian movement analysis in Chapter 6. This section also defines improvements needed to the pedestrian environments for the transit passengers accessing the transit stops. In general, improvements to the side streets leading directly to the stops on University Avenue are recommended. These improvements will encourage new transit patrons, and provide a better walking environment. The following outlines general observations regarding the street's existing conditions:

Existing Conditions

In most cases the sidewalks in the affected area are in need of some level of improvement. North Park is an older urban community and its infrastructure, including sidewalks, is in need of repair or replacement. Most sidewalks for the area's side streets are five (5) feet in width, with an additional parkway for planting.

Most of the side streets connecting to University Avenue do not have canopy trees within the parkway. Palm trees are consistently the dominant street trees. This occurs on most of the side streets in the study area from Florida Street all the way to Bancroft Street. Although palm trees offer a great skyline effect, they offer very little shade or comfort for pedestrians using the sidewalks.

All of the streets in the area provide on-street parking, consisting of both parallel and angled parking. The majority of the angled on-street parking is on the streets nearest to the central commercial core of the study area. The exceptions to this are Alabama Street and Mississippi Street. These streets have angled on-street parking on the north side of University Avenue, typically in conjunction with higher density residential developments in that area.

The majority of the streets have no above grade utilities (electrical, phone, cable) within the parkways. In most cases, the utilities lines and associated poles are located in the adjacent alleys. This condition provides for less visual clutter and a better pedestrian environment along the street.

Proposed Improvements

The quality of the pedestrian environment varies from street to street. For the streets that provide logical access to the transit stops, streetscape enhancements would provide an improved walking environment for the transit patrons. What follows is a brief description of possible improvements applicable to some or all the selected streets.

As stated earlier, the majority of the sidewalks are in various states of disrepair. It is recommended that selected sidewalks be improved to allow for a safe and convenient walking environment to University Avenue. "Canopy" type trees should be installed along the parkways to provide shade to pedestrians using the sidewalks. The canopy trees can supplement the existing palm trees already planted in the parkways.

Where feasible, existing parkways should be retrofitted to allow for wider sidewalks, as well as provide additional landscape improvements for street tree plantings. These improvements are beneficial in encouraging and increasing pedestrian mobility to the transit stops on University Avenue. Increasing the parkway could be accomplished by reducing the curb-to-curb section of the street and including excess right-of-way into the parkway. Not all of the selected streets are able to accommodate this type of treatment, and in some cases it may only be possible on one side of the street. But, where feasible, an expanded parkway should be provided to increase the pedestrian connectivity to the transit stops.

In order to further improve the pedestrian environment, above ground utilities should be placed underground when located within the right-of-way of the selected streets. However, most of the above grade utilities are in alleys, so this would not be necessary for most of the selected streets.

Accessibility needs and requirements for the disabled are defined by both the federal and state (California Title 24) standards. The ADA was signed into law on July 26, 1990 to assure that disabled persons will have full access to all public facilities along public rights-of-way.

Typically, this involves removing barriers to wheelchairs and installing accessible wheelchair ramps. However, this also includes other classifications of disability, including sight and hearing impairments. Generally, all transit stops and surrounding pedestrian facilities must comply with ADA standards and California Title 24, and take into account the entire range of disabilities.

Table 8-4 summarizes the improvements by transit stop in the eastbound and westbound direction. In general, creating a more attractive and safe pedestrian environment should be a major consideration in the continuing pursuit to promote transit. Safe and direct sidewalk connections to transit stops are one of the keys to increasing ridership and promoting transit as an attractive and viable alternative to the automobile.

Table 8-4
Pedestrian Improvements for Streets Leading to Proposed Transit Stops

Streets Leading to Stops (Westbound)	Sidewalk Replacement	Canopy Trees	Expanded Parkway	Lighting	Underground Utilities	ADA
Iowa St. Stop						
Iowa Street	√	√	√**(E)**	√		√
30th St. Stop						
Utah Street	√	√		√		√
Idaho St. Stop						
Idaho Street	√	√		√		√
Texas St. Stop						
Arizona Street	√	√	√**(B)**	√		√
Louisiana Street	√	√	√**(E)**	√		√
Alabama St. Stop						
Alabama Street	√	√	√**(W)**	√		√
Streets Leading to Stops (Eastbound)	**Sidewalk Replacement**	**Canopy Trees**	**Expanded Parkway**	**Lighting**	**Underground Utilities**	**ADA**
Alabama St. Stop						
Alabama Street	√	√		√		√
Texas St. Stop						
Louisiana Street	√	√		√		√
Arizona Street	√	√		√		√
Pershing St. Stop						
Pershing Street		√	√**(E)**	√		√
Utah Street	√	√		√		√
30th St. Stop						
30th Street Intersection	√	√		√		√
32nd St. Stop						
Herman Street	√	√		√		√

√ = Improvement Needed (B) = Both sides of the street
(E) = East side of the street
(W) = West side of the street

8.7 TRAFFIC CALMING FOR SURROUNDING COMMUNITY

The SANDAG traffic model shows that if the capacity along University Avenue is reduced from four lanes to two lanes, traffic volumes will be diverted from University Avenue onto parallel or intersecting roadways. Exhibit 8-12 illustrates the general diversion patterns anticipated with the change in traffic roadway capacity.

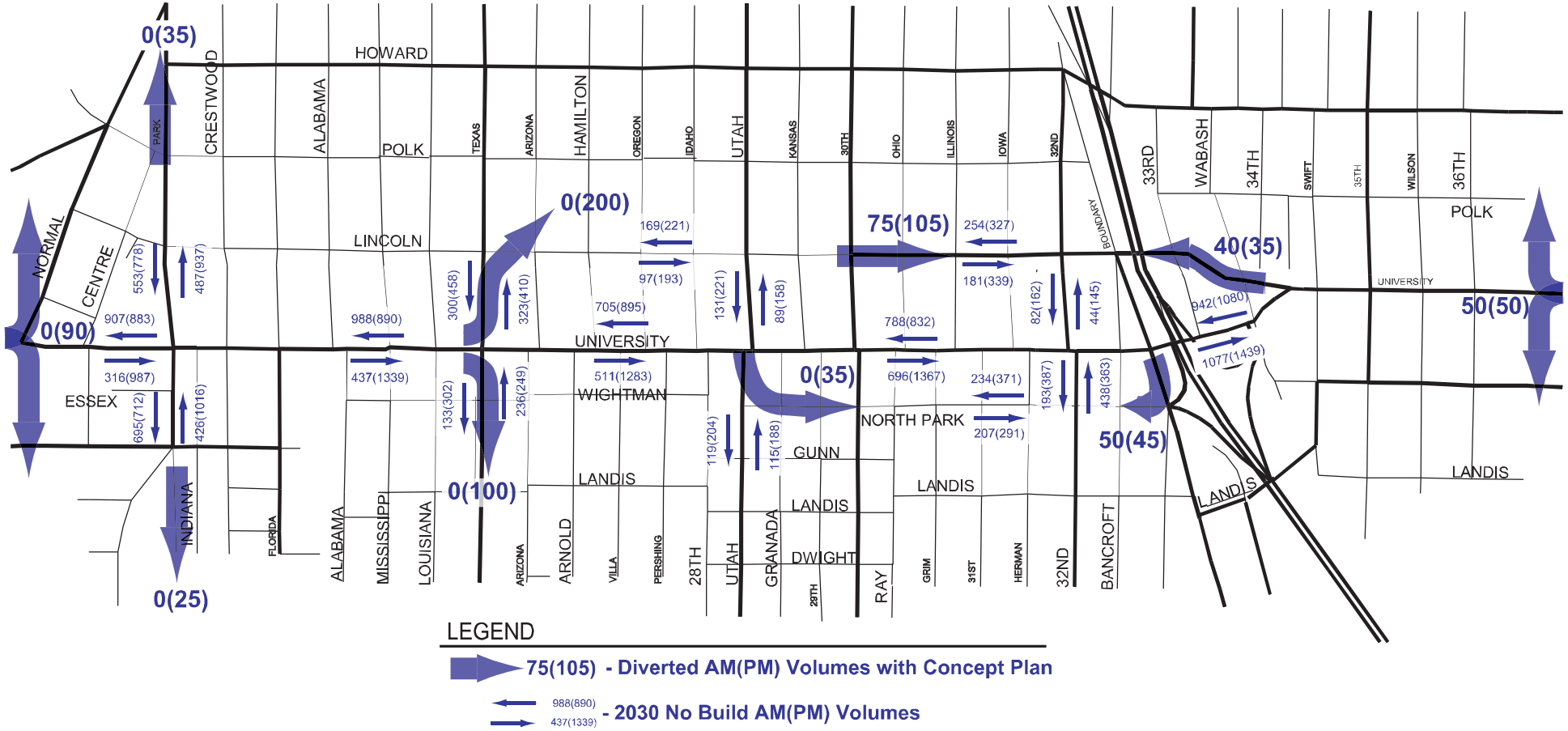
Diversion is anticipated to occur when the volume exceeds the lane capacity along University Avenue. This diversion results in an overall increase in traffic volumes along Lincoln Avenue, North Park Way, Texas Street and Utah Street. Roads that intersect with University Avenue at a signalized intersection are also anticipated to have an increase in traffic, as vehicles will use these routes to circulate off of University Avenue to get to their destination.

Most drivers will experience an increase in travel time with the Refined Concept Plan either due to delay associated with the constrained capacity or the restricted access imposed with the raised median. This can result in speeding on side streets when vehicles escape the congested conditions in order to make up for lost time.

Several existing features along North Park Way and Lincoln Avenue will serve as traffic calming devices. Along North Park Way, existing drainage swales exist – two at 32nd Street, two at Herman Avenue, one at 30th Street, one at 29th Street, and two at Granada Avenue – that require vehicles to slow down significantly. These drainage swales reduce speeds through the intersections and on the approaches to the intersection. Several intersections along North Park Way and Lincoln Avenue are controlled by all-way stops. In other words, traffic on all legs is required to stop before proceeding through the intersection. All-way stop controls interrupt the steady stream of traffic flow, thereby reducing a vehicles ability to speed along a corridor.

It may be desirable to implement additional traffic calming measures where appropriate to control the impacts associated with the diverted traffic on the surrounding community. The City of San Diego Street Design Manual includes potential traffic calming measures. Traffic calming measures are intended to slow traffic, but not divert traffic to parallel routes when applied appropriately. All roads within the project study considered for traffic calming implementation are classified as either commercial collector or local streets, both appropriate for traffic calming projects.

Traffic calming can provide for horizontal deflection, vertical deflection, and diversion of traffic or channelization of traffic. The installation of speed humps on collector streets or above are not recommended as a traffic calming measure due to increased response time impacts to emergency services. Reasonable applications of traffic calming measures within the community of North Park may include:



PEAK HOUR DIVERTED TRAFFIC

EXHIBIT 8-12

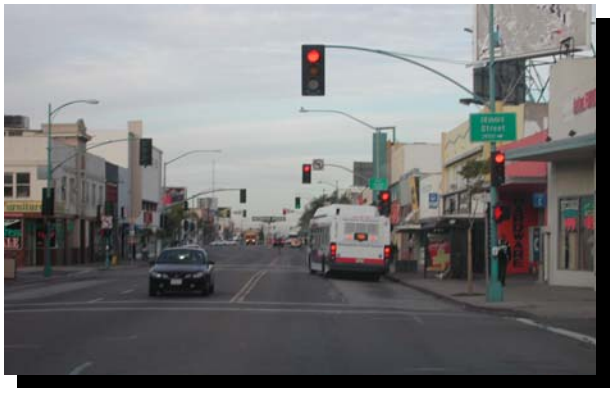
- **Modifications to Parking (angled parking on both sides of street)** – To increase parking along the University Avenue corridor, it is recommended that all through side streets that are 56 feet or wider with parallel parking on one or both sides be converted to angled parking on both sides wherever such conversion would result in a net increase in on-street parking.

  For streets where the curb-to-curb width is 42 to 52 feet, it is recommended that angled parking be provided on one side (42 foot curb-to-curb) or both sides (52 feet curb-to-curb) of the street wherever such conversion would result in a net increase in on-street parking. This will serve two purposes: increase overall parking and narrow the travel way to reduce speeds and calm traffic.

  An additional benefit for diagonal parking on the side streets is that it will also have a traffic calming effect. Where feasible, it is recommended that angled parking improvements be constructed from University Avenue to El Cajon Boulevard to the north and a minimum of one block south of University Avenue. This may require the consolidation of some driveways or reduction in driveway widths along the side streets.

Curb Extensions – Curb extensions reduce the exposure time for pedestrians along the travel way by extending the curb to the edge of the parking lane. The "neck" of the intersection is reduced from approximately 40 to 52 feet to approximately 24 feet, requiring vehicles to slow down significantly through the intersection.

Pavement Treatments – Raised crosswalks and road humps are typically not supported by emergency services because such vehicles must slow down significantly to avoid damage, which increases response times. Pavement treatments at unsignalized intersections or midblock locations, which can integrate raised pavement markers or stamped concrete, can effective replace raised pavement crossings and road humps. Pavement treatments result in vibrations within the vehicle and an audible Such treatments make drivers aware of a change in conditions.



All-Way Stops and Traffic Signals – Although not typically considered traffic calming devices, the installation of traffic signals and all-way stop control intersections can help to control speeds along roadways.

Traffic Controls

The streets and intersections most likely to be impacted in the study area by the diversion of traffic include:

- Texas Street/Lincoln Avenue (two-way stop)
- Texas Street/Wightman Avenue (two-way stop)
- Utah Street/Lincoln Avenue (signal)
- Utah Street/North Park Way (all-way stop)

- 30th Street/Lincoln Avenue (signal)
- 30th Street/ North Park Way (signal)
- 32nd Street/Lincoln Avenue (signal)
- 32nd Street/North Park Way (signal)
- Wabash Street/Lincoln Avenue (signal)

Of these nine intersections, six are currently signalized, one is an all-way stop controlled intersection and two are two-way stop controlled intersections. Preliminary traffic signal warrant analyses were conducted for all unsignalized intersections listed above, as provided in the Appendix and summarized in Table 8-5.

Table 8-5
Preliminary Traffic Signal Warrant Analysis
Potential Traffic Calming Locations

Intersection	Main Street ADT	Minor Street ADT[1]	Minimum Vehicular Flow Met?	Interruption Continuous Flow Met?	Warrant Satisfied?
Texas Street/Lincoln Avenue	13,300	3,420	Yes	Yes	Yes
Texas Street/Whitman Avenue	5,900	1,920	No	No	No
Utah Street/North Park Way	5,200	2,880	No	No	No

1 Higher Volume Approach, One Direction Only.

Texas Street

Because of the regional connectivity of Texas Street, a modification to on-street parking, from parallel to angled, is not recommended. Traffic control modifications at the intersection of Texas Street/Lincoln Avenue are recommended to eliminate the existing turn restriction devices installed. As shown, a traffic signal is warranted at this intersection by the year 2030. Additional improvements along Texas Street may include the integration of enhanced pedestrian crossings, streetscape improvements and curb extensions at intersections.

Utah Street

The Refined Concept Plan provides a transit only lane eastbound from Utah Street to Boundary Street. It is anticipated that traffic diversion will occur both north and south of University Avenue at Utah Street. The intersection of Utah Street/Lincoln Avenue is currently signalized. Utah Street/North Park Way is a T-intersection with stop control on all approaches. Although the preliminary traffic signal warrant analysis shows that a traffic signal is not warranted at this location, volumes and queuing should be monitored in the future to ensure efficient flow, particularly, the queuing resulting from heavy left turn movement anticipated to occur from southbound Utah Street to eastbound North Park Way. Enhanced

pavement treatments, marked pedestrian crossings and curb-extensions at the intersections of Utah Street/North Park Way and Utah Street/Lincoln Avenue should be considered for the Utah Street corridor.

30th Street

Thirtieth Street is also a regional serving arterial, with signalized intersections at both Lincoln Avenue and North Park Way. Curb extensions and pavement treatments are reasonable improvements that should be considered to help slow traffic along 30th Street north and south of the corridor. Modifications to parking should be considered where applicable. However, City traffic volume thresholds for angled parking may be exceeded by the year 2030.

32nd Street

Thirty-Second Street is the first signalized intersection on the eastern end of the corridor and is anticipated to carry an increase in traffic volume over existing conditions. Improvements at intersections with both Lincoln Avenue and North Park Way should be considered. Curb-to-curb width on 32nd Street south of University Avenue is not sufficient to modify parking. However curb extensions, enhanced pavement treatments and traffic control improvements are reasonable traffic calming measures that could be implemented along 32nd Street.

Wabash Street

Wabash Street connects northbound I-805 off-ramp traffic to Lincoln Avenue and will serve as a by-pass route for University Avenue. Improvements to the intersection of Wabash Street/Lincoln Avenue may need to be considered to meet the forecast traffic demands at this location.

Exhibit 8-13 depicts potential traffic calming measures for the surrounding community that may be pursued in the future if they are deemed appropriate after implementation of the Refined Concept Plan. These measures aim to slow traffic along those streets anticipated to be most heavily impacted by the diversion of traffic. Operational impacts were not addressed in this study. Implementation of any of these measures in the future will follow the City of San Diego established process for evaluating traffic calming measures. Table 8-6 provides general estimates of cost to implement these traffic calming devices per location.

POTENTIAL TRAFFIC CALMING MEASURES

ENHANCEMENT OF EXISTING MARKED CROSSWALK; OPTIONS INCLUDE:

- ENHANCED PAVEMENT MARKING
- PAVEMENT FLASHERS (UNCONTROLLED APPROACHES ONLY)
- PAVEMENT TREATMENT

NEW MARKED CROSSWALK; OPTIONS INCLUDE:

- ENHANCED PAVEMENT MARKING
- PAVEMENT FLASHERS (UNCONTROLLED APPROACHES ONLY)
- PAVEMENT TREATMENT

EXISTING TRAFFIC SIGNAL

EXISTING ALL-WAY STOP

EXISTING TWO-WAY STOP

NEW CURB EXTENSION (POPOUT)

S NEW "GATEWAY TO NORTH PARK" SIGNAGE

NORTH
Not to Scale

POTENTIAL TRAFFIC CALMING LOCATIONS

EXHIBIT 8-13

Table 8-6
Traffic Calming Measures

Location	Types of Traffic Calming Measures				
	Curb Extensions	**Pavement Treatments**	**Enhanced Crosswalk Pavement Markings**	**Crosswalk with In-Pavement Flashers**	**Signage**
	$60K -$80K per corner	$5 –$10K per location	$1,500-$3,000 per location	$10-$15K per location	$250-$1,500 per location
Utah Street / Lincoln Avenue	Y		Y		
30th Street / Lincoln Avenue	Y		Y		
Ohio Street/Lincoln Avenue	Y		Y		
Illinois Street/Lincoln Avenue	Y		Y		
Iowa Street/Lincoln Avenue	Y		Y	Y	
32nd Street / Lincoln Avenue	Y		Y		
Boundary Street / Lincoln Avenue		Y			Y
Utah Street / North Park Way	Y		Y		
29th Street/North Park Way	Y		Y	Y	
30th Street / North Park Way	Y		Y		
Grim Avenue/North Park Way	Y		Y		
31st Street/North Park Way	Y		Y		
Herman Avenue/North Park Way	Y		Y		
32nd Street / North Park Way	Y		Y		
Boundary Street / North Park Way		Y			Y

Note: Cost estimates are Planning-level estimates based on year 2004 dollars.

8.8 RIGHT-OF-WAY NEEDS

Efforts were made at all locations to minimize the impacts to right-of-way along the corridor. In order to achieve this, traffic lanes are reduced to a substandard 10 or 11 feet. Although the standard width for a travel lane is 12 feet, existing lanes along University Avenue are 9 to 10 feet. Therefore, the Refined Concept Plan lane widths would be an improvement over the existing condition.

One location along University Avenue was identified wherethe Refined Concept Plan would modify the curb-to-curb width on University Avenue. East of 30th Street, the curb is carved out to provide for on-street parallel parking outside of the travel lane. The Refined Concept Plan would fill in the existing on-street parking with treated stamped concrete to match existing sidewalk patterns in this area. The transit stop would be located where the existing parking cut out currently exists. To provide a smooth transition along the corridor, the eastern end of the block may need to be shortened by approximately three feet. Overall this modification to the existing curb would result in a net increase in sidewalk area on this block.

8.9 UTILITY RELOCATION

With the construction of new curb extensions, existing utilities will need to be relocated. A number of storm water curb inlets would need to be rebuilt to accommodate the new construction. Sewer manholes and water valve cans located in the areas of the new medians will also need adjustment to ultimate finish grade. Most of the existing street lights would remain in their current location with the exception of a few that may need to be moved closer to the roadway as the curb is realigned on the south side of the street between 28th Street and Ray Street. The addition and/or modification to the traffic signals may provide enough light based on City standards so that the existing street light can remain in place. The ultimate location of street lighting should be evaluated in final design. Adjustments to dry utilities (SDG&E, SBC, Cable) will be affected with the reconstruction of University Avenue. Changes in the vertical elevation of the roadway will require the tops of the affected utility boxes to be adjusted.